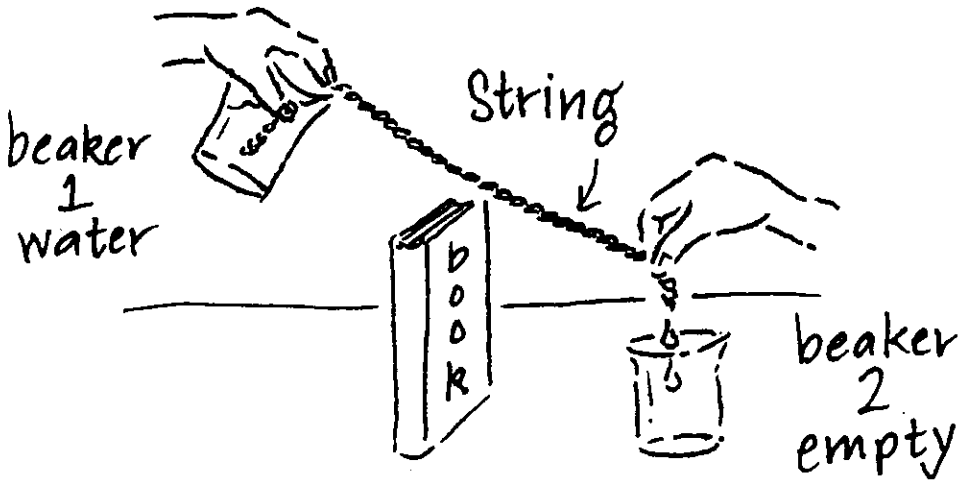
Water String Travels

Grades 4-6



Overview

This is a short lesson: about 30-35 minutes. The students are studying the properties of water. In this lesson the students will observe how water travels from one beaker across a wet string (20 cm) to a second empty beaker. The water molecules are attracted to the string molecules by ***adhesion.***

Objective

- To help students understand that some liquids have strong cohesive forces between their molecules.

Vocabulary

- **Cohesion:** Mutual attraction by which the elements of a body (water) are held together.
- **Adhesion**: Physical attraction or joining of two substances.

Materials

For the presenter:

- two beakers
- string (must be water absorbent)
- one book

For the students:

- paper for drawing a cartoon
- pencils

Getting Ready

Fill one of the beakers about 3/4 full with water and have it on a table on one side of an old book and the other empty beaker about 20 cm on the other side of the book. Place the string on the table in front of the beaker of water. (See drawing) Note: It is best to use an old book in case of an accident.

Procedures

1. ***Focus*** "The task is to get the water from beaker #1 to beaker #2 without moving beaker one or two to the other side of the book. **Q.** Any ideas?"
2. Share the objective at this time.
3. Wet the string thoroughly in the water in beaker #1.
4. Hold one end of the wet string into beaker #1's water and the other end over and into empty beaker #2. [See the drawing]
5. Pour the water slowly across the string.
6. Repeat steps 1-5, except this time use a ***dry*** string and be sure to have an old book or some other type of divider that you do not mind getting wet.

Questions

"What were the different results in using a wet versus a dry string?"
"Why did the string have to be wet for the water to travel on it?"
"What other materials would transfer the water instead of string? Why?"
"What other materials would not transfer the water? Why not?"
"What other liquids would or would not transfer along the string?"

Explanation

The string had to be wet so the water molecules would adhere to the string molecules. The water molecules are attracted to the string molecules by the process of ***adhesion.*** Because of the ***cohesive forces*** between like molecules of water, the water was able to cling to the water molecules on the wet string. The water in beaker #1 cannot be transferred to beaker #2 with a dry string or any other material that does not absorb water.

Other materials that are water absorbent that can be substituted for the string are: cotton, cloth, paper, wood, etc. Non water-absorbent materials like nylon or wool will not transfer the water. Other liquids that have strong cohesive forces between their molecules that can transfer like the water are vinegar, oil, syrup, etc.

Closure

Ask the students to:

1. Discuss these two questions in your groups and then draw a cartoon of water molecules talking to each other which depict their roles in this activity.

   Q. "Define the term ***"adhesion"*** and how did it work during this demonstration?"
   Q. "Can you define ***cohesion*** and explain its role in the transfer of water?"

2. Students share their cartoons with the class.

Clean Up

Each student / group participates in the clean up process; two students with the teacher's permission can hang up the cartoons.